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Modeling of Nonlinear Environment with the Help of Families of the Atomic Functions

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Abstract
The procedure of constructing families of the atomic radial basis functions, which are recommended to be used to account for the heterogeneity of the environment in the simulation of physical processes is been considered The solution of corresponding boundary problems are performed by meshless scheme, and the atomic functions are selected which satisfy the requirements. The families of infinitely differentiable compactly supported functions that are solutions of functional differential equations of special type had been considered
Expansion of classes of the atomic functions of several variables and expanding their properties considered is constructing a family of atomic radial basis functions of three independent variables on the example of the special type functionally-differentional equations.
It should be noted that the support region is dependent on the compression ratio and can be specified in processes of construction solutions to provide the corresponding properties of the desired functions.

Keywords
atomic functions, radial basis functions, meshless methods

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In order to expand the class of atomic functions and improve their properties, consider building a family of atomic radial basic function three independent variables on the example the solution of functional-differential equation special form. We considered this functional differential equation, which had been constructed with help the Helmholtz operator that plays an important role in mathematical physics, due to the problems which occurs in the thermal conductivity, in the diffusion processes, in the wave processes and others. Thus we get the opportunity to choose appropriate atomic functions for more accurate modeling environment using feature mesh-free method for solving the boundary problem describing the research process.